



SEQUENCE LISTING

```
<110> Scott, Mathew P.
      Goodrich, Lisa V.
      Johnson, Ronald L.
      Epstein, Ervin Jr.
<120> PATCHED GENES AND USES RELATED THERETO
<130> CIBT-P04-203
<140> US 08/916,140
<141> 1997-08-21
<150> US 08/656,055
<151> 1996-05-31
<150> US 08/540,406
<151> 1995-10-06
<150> US 08/319,745
<151> 1994-10-07
<160> 64
<170> FastSEQ for Windows Version 4.0
<210> 1
<211> 736
<212> DNA
<213> Bettle
<220>
<221> misc feature
<222> 4, 5, 7, 8, 10, 11, 23, 34, 35, 36, 39, 40, 41, 45, 51, 52, 57, 61, 71, 75, 77, 87, 88, 89, 91, 92, 96, 97, 100, 104,
106, 109, 111, 113, 117, 120, 126, 149, 151, 153, 154, 157, 178, 187, 189, 191, 211, 214, 310, 608, 704, 708, 712
<223> n = A, T, C or G
<221> misc_feature
<222> 714, 729, 732
<223> n = A, T, C \text{ or } G
<400> 1
aacnncnntn natggcaccc ccncccaacc tttnnnccnn ntaancaaaa nnccccnttt 60
nataccccct ntaananttt tccaccnnnc nnaaannccn ctgnanacna ngnaaanccn 120
tttttnaacc cccccaccc ggaattccna ntnnccnccc ccaaattaca actccagncc 180
aaaattnana naattggtcc taacctaacc natngttgtt acggtttccc cccccaaata 240
catgcactgg cccgaacact tgatcgttgc cgttccaata agaataaatc tggtcatatt 300
aaacaagccn aaagctttac aaactgttgt acaattaatg ggcgaacacg aactgttcga 360
attctggtct ggacattaca aagtgcacca catcggatgg aaccaggaga aggccacaac 420
cgtactgaac gcctggcaga agaagttcgc acaggttggt ggttggcgca aggagtagag 480
tgaatggtgg taatttttgg ttgttccagg aggtggatcg tctgacgaag agcaagaagt 540
cqtcqaatta catcttcqtq acgttctcca ccgccaattt gaacaagatg ttgaaggagg 600
cgtcgaanac ggacgtggtg aagctggggg tggtgctggg ggtggcggcg gtgtacgggt 660
```

```
gggtggccca gtcggggctg gctgccttgg gagtgctggt cttngcgngc tncnattcgc 720
                                                                   736
cctatagtna gncgta
<210> 2
<211> 107
<212> PRT
<213> Beetle
<220>
<221> VARIANT
<222> 1, 9, 12, 13, 14, 20
<223> Xaa = Any Amino Acid
<400> 2
Xaa Pro Pro Pro Asn Tyr Asn Ser Xaa Pro Lys Xaa Xaa Xaa Leu Val
 1
Leu Thr Pro Xaa Val Val Thr Val Ser Pro Pro Lys Tyr Met His Trp
                                                     30
Pro Glu His Leu Ile Val Ala Val Pro Ile Arg Ile Asn Leu Val Ile
Leu Asn Lys Pro Lys Ala Leu Gln Thr Val Val Gln Leu Met Gly Glu
                        55
His Glu Leu Phe Glu Phe Trp Ser Gly His Tyr Lys Val His His Ile
                                        75
                    70
Gly Trp Asn Gln Glu Lys Ala Thr Thr Val Leu Asn Ala Trp Gln Lys
                                    90
                85
Lys Phe Ala Gln Val Gly Gly Trp Arg Lys Glu
            100
                                105
<210> 3
<211> 5187
<212> DNA
<213> Butterfly
<400> 3
gggtctgtca cccggagccg gagtccccgg cggccagcag cgtcctcgcg agccgagcgc 60
ccaqqcqcqc ccqqaqcccq cggcggcggc ggcaacatgg cctcggctgg taacgccgcc 120
ggggccctgg gcaggcaggc cggcggcggg aggcgcagac ggaccggggg accgcaccgc 180
gccgcgccgg accgggacta tctgcaccgg cccagctact gcgacgccgc cttcgctctg 240
gagcagattt ccaaggggaa ggctactggc cggaaagcgc cgctgtggct gagagcgaag 300
tttcagagac tcttatttaa actgggttgt tacattcaaa agaactgcgg caagtttttg 360
gttgtgggtc tcctcatatt tggggccttc gctgtgggat taaaggcagc taatctcgag 420
accaacgtgg aggagctgtg ggtggaagtt ggtggacgag tgagtcgaga attaaattat 480
accegteaga agataggaga agaggetatg tttaateete aacteatgat acagaeteea 540
aaagaagaag gcgctaatgt tctgaccaca gaggctctcc tgcaacacct ggactcagca 600
ctccaggcca gtcgtgtgca cgtctacatg tataacaggc aatggaagtt ggaacatttg 660
tgctacaaat caggggaact tatcacggag acaggttaca tggatcagat aatagaatac 720
ctttaccctt gcttaatcat tacacctttg gactgcttct gggaaggggc aaagctacag 780
tccgggacag catacctcct aggtaagcct cctttacggt ggacaaactt tgaccccttg 840
gaattcctag aagagttaaa gaaaataaac taccaagtgg acagctggga ggaaatgctg 900
aataaagccg aagttggcca tgggtacatg gaccggcctt gcctcaaccc agccgaccca 960
gattgccctg ccacagcccc taacaaaaat tcaaccaaac ctcttgatgt ggcccttgtt 1020
ttgaatggtg gatgtcaagg tttatccagg aagtatatgc attggcagga ggagttgatt 1080
gtgggtggta ccgtcaagaa tgccactgga aaacttgtca gcgctcacgc cctgcaaacc 1140
atgttccagt taatgactcc caagcaaatg tatgaacact tcaggggcta cgactatgtc 1200
tctcacatca actggaatga agacagggca gccgccatcc tggaggcctg gcagaggact 1260
tacgtggagg tggttcatca aagtgtcgcc ccaaactcca ctcaaaaggt gcttcccttc 1320
```

acaaccacga ccctggacga catcctaaaa tccttctctg atgtcagtgt catccgagtg 1380 gccagcggct acctactgat gcttgcctat gcctgtttaa ccatgctgcg ctgggactgc 1440 tccaagtccc agggtgccgt ggggctggct ggcgtcctgt tggttgcgct gtcagtggct 1500 gcaggattgg gcctctgctc cttgattggc atttctttta atgctgcgac aactcaggtt 1560 ttgccgtttc ttgctcttgg tgttggtgtg gatgatgtct tcctcctggc ccatgcattc 1620 agtgaaacag gacagaataa gaggattcca tttgaggaca ggactgggga gtgcctcaag 1680 cgcaccggag ccagcgtggc cctcacctcc atcagcaatg tcaccgcctt cttcatggcc 1740 gcattgatcc ctatccctgc cctgcgagcg ttctccctcc aggctgctgt ggtggtggta 1800 ttcaattttg ctatggttct gctcattttt cctgcaattc tcagcatgga tttatacaga 1860 cgtgaggaca gaagattgga tattttctgc tgtttcacaa gcccctgtgt cagcagggtg 1920 attcaagttg agccacaggc ctacacagag cctcacagta acacccggta cagcccccca 1980 ccccataca ccagccacag cttcgcccac gaaacccata tcactatgca gtccaccgtt 2040 cageteegea cagagtatga ceeteacaeg caegtgtaet acaecaeege egageeaege 2100 tctgagatct ctgtacagcc tgttaccgtc acccaggaca acctcagctg tcagagtccc 2160 gagagcacca getetaccag ggacetgete teccagttet cagaetecag cetecaetge 2220 ctcgagcccc cctgcaccaa gtggacactc tcttcgtttg cagagaagca ctatgctcct 2280 ttcctcctga aacccaaagc caaggttgtg gtaatccttc ttttcctggg cttgctgggg 2340 gtcagccttt atgggaccac ccgagtgaga gacgggctgg acctcacgga cattgttccc 2400 cgggaaacca gagaatatga cttcatagct gcccagttca agtacttctc tttctacaac 2460 atgtatatag tcacccagaa agcagactac ccgaatatcc agcacctact ttacgacctt 2520 cataagagtt tcagcaatgt gaagtatgtc atgctggagg agaacaagca acttccccaa 2580 atgtggctgc actactttag agactggctt caaggacttc aggatgcatt tgacagtgac 2640 tgggaaactg ggaggatcat gccaaacaat tataaaaatg gatcagatga cggggtcctc 2700 gcttacaaac tcctggtgca gactggcagc cgagacaagc ccatcgacat tagtcagttg 2760 actaaacagc gtctggtaga cgcagatggc atcattaatc cgagcgcttt ctacatctac 2820 ctgaccgctt gggtcagcaa cgaccctgta gcttacgctg cctcccaggc caacatccgg 2880 cctcaccggc cggagtgggt ccatgacaaa gccgactaca tgccagagac caggctgaga 2940 atcccagcag cagagcccat cgagtacgct cagttccctt tctacctcaa cggcctacga 3000 gacacctcag actttgtgga agccatagaa aaagtgagag tcatctgtaa caactatacg 3060 agcctgggac tgtccagcta ccccaatggc taccccttcc tgttctggga gcaatacatc 3120 agectgegee aetggetget getatecate agegtggtge tggeetgeae gtttetagtg 3180 tgcgcagtct tcctcctgaa cccctggacg gccgggatca ttgtcatggt cctggctctg 3240 atgaccgttg agctctttgg catgatgggc ctcattggga tcaagctgag tgctgtgcct 3300 gcctttctga cagccattgg ggacaagaac cacagggcta tgctcgctct ggaacacatg 3420 tttgctcccg ttctggacgg tgctgtgtcc actctgctgg gtgtactgat gcttgcaggg 3480 tecgaatttg attteattgt cagatactte tttgeegtee tggeeattet caeegtettg 3540 ggggttctca atggactggt tctgctgcct gtcctcttat ccttctttgg accgtgtcct 3600 gaggtgtctc cagccaatgg cctaaaccga ctgcccactc cttcgcctga gccgcctcca 3660 agtgtcgtcc ggtttgccgt gcctcctggt cacacgaaca atgggtctga ttcctccgac 3720 tcggagtaca gctctcagac cacggtgtct ggcatcagtg aggagctcag gcaatacgaa 3780 gcacagcagg gtgccggagg ccctgcccac caagtgattg tggaagccac agaaaaccct 3840 gtctttgccc ggtccactgt ggtccatccg gactccagac atcagcctcc cttgacccct 3900 cggcaacagc cccacctgga ctctggctcc ttgtcccctg gacggcaagg ccagcagcct 3960 cgaagggatc cccctagaga aggcttgcgg ccaccccct acagaccgcg cagagacgct 4020 tttgaaattt ctactgaagg gcattctggc cctagcaata gggaccgctc agggccccgt 4080 ggggcccgtt ctcacaaccc tcggaaccca acgtccaccg ccatgggcag ctctgtgccc 4140 agctactgcc agcccatcac cactgtgacg gcttctgctt cggtgactgt tgctgtgcat 4200 ccccgcctg gacctgggcg caacccccga ggggggccct gtccaggcta tgagagctac 4260 cctgagactg atcacggggt atttgaggat cctcatgtgc cttttcatgt caggtgtgag 4320 aggagggact caaaggtgga ggtcatagag ctacaggacg tggaatgtga ggagaggccg 4380 tgggggagca gctccaactg agggtaatta aaatctgaag caaagaggcc aaagattgga 4440 aagccccgcc cccacctctt tccagaactg cttgaagaga actgcttgga attatgggaa 4500 ggcagttcat tgttactgta actgattgta ttattkkgtg aaatatttct ataaatattt 4560 aaraggtgta cacatgtaat atacatggaa atgctgtaca gtctatttcc tggggcctct 4620 ccactcctgc cccagagtgg ggagaccaca ggggcccttt cccctgtgta cattggtctc 4680 tgtgccacaa ccaagcttaa cttagtttta aaaaaaatct cccagcatat gtcgctgctg 4740 cttaaatatt gtataattta cttgtataat tctatgcaaa tattgcttat gtaataggat 4800 tatttgtaaa ggtttctgtt taaaatattt taaatttgca tatcacaacc ctgtggtagg 4860

```
atgaattgtt actgttaact tttgaacacg ctatgcgtgg taattgttta acgagcagac 4920 atgaagaaaa caggttaatc ccagtggctt ctctaggggt agttgtatat ggttcgcatg 4980 ggtggatgtg tgtgtgcatg tgactttcca atgtactgta ttgtggtttg ttgttgttgt 5040 tgctgttgtt gttcattttg gtgtttttgg ttgctttgta tgatcttagc tctggcctag 5100 gtgggctggg aaggtccagg tctttttctg tcgtgatgct ggtggaaagg tgaccccaat 5160 catctgtcct attctggg actattc 5187
```

```
<210> 4
<211> 1311
<212> PRT
<213> Butterfly
<220>
<221> VARIANT
<222> 348, 908
<223> Xaa = Any Amino Acid
<400> 4
Met Val Ala Pro Asp Ser Glu Ala Pro Ser Asn Pro Arg Ile Thr Ala
                                    10
Ala His Glu Ser Pro Cys Ala Thr Glu Ala Arg His Ser Ala Asp Leu
                                25
Tyr Ile Arg Thr Ser Trp Val Asp Ala Ala Leu Ala Leu Ser Glu Leu
                            40
                                                 45
Glu Lys Gly Asn Ile Glu Gly Gly Arg Thr Ser Leu Trp Ile Arg Ala
                        55
                                             60
Trp Leu Gln Glu Gln Leu Phe Ile Leu Gly Cys Phe Leu Gln Gly Asp
                    70
                                         75
Ala Gly Lys Val Leu Phe Val Ala Ile Leu Val Leu Ser Thr Phe Cys
                85
                                    90
Val Gly Leu Lys Ser Ala Gln Ile His Thr Arg Val Asp Gln Leu Trp
                                105
                                                     110
Val Gln Glu Gly Gly Arg Leu Glu Ala Glu Leu Lys Tyr Thr Ala Gln
                            120
                                                 125
Ala Leu Gly Glu Ala Asp Ser Ser Thr His Gln Leu Val Ile Gln Thr
                        135
                                             140
Ala Lys Asp Pro Asp Val Ser Leu Leu His Pro Gly Ala Leu Leu Glu
                    150
                                        155
His Leu Lys Val Val His Ala Ala Thr Arg Val Thr Val His Met Tyr
                165
                                    170
                                                         175
Asp Ile Glu Trp Arg Leu Lys Asp Leu Cys Tyr Ser Pro Ser Ile Pro
                                185
                                                     190
Asp Phe Glu Gly Tyr His His Ile Glu Ser Ile Ile Asp Asn Val Ile
                            200
                                                 205
Pro Cys Ala Ile Ile Thr Pro Leu Asp Cys Phe Trp Glu Gly Ser Lys
                        215
                                             220
Leu Leu Gly Pro Asp Tyr Pro Ile Tyr Val Pro His Leu Lys His Lys
                    230
                                         235
                                                             240
Leu Gln Trp Thr His Leu Asn Pro Leu Glu Val Val Glu Glu Val Lys
                                    250
                                                         255
                245
Lys Leu Lys Phe Gln Phe Pro Leu Ser Thr Ile Glu Ala Tyr Met Lys
                                                     270
                                265
Arg Ala Gly Ile Thr Ser Ala Tyr Met Lys Lys Pro Cys Leu Asp Pro
                            280
                                                 285
Thr Asp Pro His Cys Pro Ala Thr Ala Pro Asn Lys Lys Ser Gly His
    290
                        295
                                             300
```

Ile Pro Asp Val Ala Ala Glu Leu Ser His Gly Cys Tyr Gly Phe Ala Ala Ala Tyr Met His Trp Pro Glu Gln Leu Ile Val Gly Gly Ala Thr Arg Asn Ser Thr Ser Ala Leu Arg Lys Ala Arg Xaa Leu Gln Thr Val Val Gln Leu Met Gly Glu Arg Glu Met Tyr Glu Tyr Trp Ala Asp His Tyr Lys Val His Gln Ile Gly Trp Asn Gln Glu Lys Ala Ala Ala Val Leu Asp Ala Trp Gln Arg Lys Phe Ala Ala Glu Val Arg Lys Ile Thr Thr Ser Gly Ser Val Ser Ser Ala Tyr Ser Phe Tyr Pro Phe Ser Thr Ser Thr Leu Asn Asp Ile Leu Gly Lys Phe Ser Glu Val Ser Leu Lys Asn Ile Ile Leu Gly Tyr Met Phe Met Leu Ile Tyr Val Ala Val Thr Leu Ile Gln Trp Arg Asp Pro Ile Arg Ser Gln Ala Gly Val Gly Ile Ala Gly Val Leu Leu Ser Ile Thr Val Ala Ala Gly Leu Gly Phe Cys Ala Leu Leu Gly Ile Pro Phe Asn Ala Ser Ser Thr Gln Ile Val Pro Phe Leu Ala Leu Gly Leu Gly Val Gln Asp Met Phe Leu Leu Thr His Thr Tyr Val Glu Gln Ala Gly Asp Val Pro Arg Glu Glu Arg Thr Gly Leu Val Leu Lys Lys Ser Gly Leu Ser Val Leu Leu Ala Ser Leu Cys Asn Val Met Ala Phe Leu Ala Ala Ala Leu Leu Pro Ile Pro Ala Phe Arg Val Phe Cys Leu Gln Ala Ala Ile Leu Leu Leu Phe Asn Leu Gly Ser Ile Leu Leu Val Phe Pro Ala Met Ile Ser Leu Asp Leu Arg Arg Arg Ser Ala Ala Arg Ala Asp Leu Leu Cys Cys Leu Met Pro Glu Ser Pro Leu Pro Lys Lys Ile Pro Glu Arg Ala Lys Thr Arg Lys Asn Asp Lys Thr His Arg Ile Asp Thr Thr Arg Gln Pro Leu Asp Pro Asp Val Ser Glu Asn Val Thr Lys Thr Cys Cys Leu Ser Val Ser Leu Thr Lys Trp Ala Lys Asn Gln Tyr Ala Pro Phe Ile Met Arg Pro Ala Val Lys Val Thr Ser Met Leu Ala Leu Ile Ala Val Ile Leu Thr Ser Val Trp Gly Ala Thr Lys Val Lys Asp Gly Leu Asp Leu Thr Asp Ile Val Pro Glu Asn Thr Asp Glu His Glu Phe Leu Ser Arg Gln Glu Lys Tyr Phe Gly Phe Tyr Asn Met Tyr Ala Val Thr Gln Gly Asn Phe Glu Tyr Pro Thr Asn Gln Lys Leu Leu Tyr Glu Tyr His Asp Gln Phe Val Arg Ile Pro Asn Ile Ile Lys Asn Asp Asn Gly Gly Leu Thr Lys Phe

```
Trp Leu Ser Leu Phe Arg Asp Trp Leu Leu Asp Leu Gln Val Ala Phe
                                            780
                        775
Asp Lys Glu Val Ala Ser Gly Cys Ile Thr Gln Glu Tyr Trp Cys Lys
                                        795
                    790
Asn Ala Ser Asp Glu Gly Ile Leu Ala Tyr Lys Leu Met Val Gln Thr
                805
                                    810
Gly His Val Asp Asn Pro Ile Asp Lys Ser Leu Ile Thr Ala Gly His
                                825
Arg Leu Val Asp Lys Asp Gly Ile Ile Asn Pro Lys Ala Phe Tyr Asn
                            840
Tyr Leu Ser Ala Trp Ala Thr Asn Asp Ala Leu Ala Tyr Gly Ala Ser
                        855
                                            860
Gln Gly Asn Leu Lys Pro Gln Pro Gln Arg Trp Ile His Ser Pro Glu
                                        875
                    870
Asp Val His Leu Glu Ile Lys Lys Ser Ser Pro Leu Ile Tyr Thr Gln
                                    890
                885
Leu Pro Phe Tyr Leu Ser Gly Leu Ser Asp Thr Xaa Ser Ile Lys Thr
                                905
            900
Leu Ile Arg Ser Val Arg Asp Leu Cys Leu Lys Tyr Glu Ala Lys Gly
        915
                            920
Leu Pro Asn Phe Pro Ser Gly Ile Pro Phe Leu Phe Trp Glu Gln Tyr
                        935
Leu Tyr Leu Arg Thr Ser Leu Leu Leu Ala Leu Ala Cys Ala Leu Ala
                    950
                                        955
Ala Val Phe Ile Ala Val Met Val Leu Leu Leu Asn Ala Trp Ala Ala
                                    970
                965
Val Leu Val Thr Leu Ala Leu Ala Thr Leu Val Leu Gln Leu Leu Gly
                                985
            980
Val Met Ala Leu Leu Gly Val Lys Leu Ser Ala Met Pro Ala Val Leu
                            1000
                                                1005
        995
Leu Val Leu Ala Ile Gly Arg Gly Val His Phe Thr Val His Leu Cys
                        1015
                                            1020
Leu Gly Phe Val Thr Ser Ile Gly Cys Lys Arg Arg Arg Ala Ser Leu
                    1030
                                        1035
1025
Ala Leu Glu Ser Val Leu Ala Pro Val Val His Gly Ala Leu Ala Ala
                                    1050
                1045
Ala Leu Ala Ala Ser Met Leu Ala Ala Ser Glu Cys Gly Phe Val Ala
                                1065
            1060
Arg Leu Phe Leu Arg Leu Leu Asp Ile Val Phe Leu Gly Leu Ile
                            1080
                                                1085
       1075
Asp Gly Leu Leu Phe Phe Pro Ile Val Leu Ser Ile Leu Gly Pro Ala
                        1095
                                            1100
Ala Glu Val Arg Pro Ile Glu His Pro Glu Arg Leu Ser Thr Pro Ser
                    1110
                                        1115
1105
Pro Lys Cys Ser Pro Ile His Pro Arg Lys Ser Ser Ser Ser Gly
                                    1130
                1125
Gly Gly Asp Lys Ser Ser Arg Thr Ser Lys Ser Ala Pro Arg Pro Cys
                                1145
                                                    1150
            1140
Ala Pro Ser Leu Thr Thr Ile Thr Glu Glu Pro Ser Ser Trp His Ser
                            1160
                                                1165
        1155
Ser Ala His Ser Val Gln Ser Ser Met Gln Ser Ile Val Val Gln Pro
                                            1180
                        1175
Glu Val Val Val Glu Thr Thr Thr Tyr Asn Gly Ser Asp Ser Ala Ser
                                        1195
                    1190
Gly Arg Ser Thr Pro Thr Lys Ser Ser His Gly Gly Ala Ile Thr Thr
                1205
                                    1210
Thr Lys Val Thr Ala Thr Ala Asn Ile Lys Val Glu Val Val Thr Pro
                                1225
                                                    1230
```

Ser Asp Arg Lys Ser Arg Arg Ser Tyr His Tyr Tyr Asp Arg Arg 1240 1245 1235 Asp Arg Asp Glu Asp Arg Asp Arg Asp Arg Glu Arg Asp Arg Asp 1260 1255 1250 Asp Arg 1270 1275 1280 1265 Glu Arg Ser Arg Glu Arg Asp Arg Arg Asp Arg Tyr Arg Asp Glu Arg 1290 1295 1285 Asp His Arg Ala Ser Pro Arg Glu Lys Arg Gln Arg Phe Trp Thr 1300 1305 1310

<210> 5 <211> 4434 <212> DNA <213> Drosophila

<400> 5

cgaaacaaga gagcgagtga gagtagggag agcgtctgtg ttgtgtgttg agtgtcgcc 60 acgcacacag gcgcaaaaca gtgcacacag acgcccgctg ggcaagaaga agtgagagag 120 agaaacagcg gcgcgcgctc gcctaatgaa gttgttggcc tggctggcgt gccgcatcca 180

cgagatacag atacatetet catggacege gacageetee caegegttee ggacacacae 240 ggcgatgtgg tcgatgagaa attattctcg gatctttaca tacgcaccag ctgggtggac 300 gcccaagtgg cgctcgatca gatagataag ggcaaagcgc gtggcagccg cacggcgatc 360 tatctgcgat cagtattcca gtcccacctc gaaaccctcg gcagctccgt gcaaaagcac 420 gcgggcaagg tgctattcgt ggctatcctg gtgctgagca ccttctgcgt cggcctgaag 480 agegeceaga tecaetecaa ggtgeaceag etgtggatee aggagggegg eeggetggag 540 gcggaactgg cctacacaca gaagacgatc ggcgaggacg agtcggccac gcatcagctg 600 ctcattcaga cgacccacga cccgaacgcc tccgtcctgc atccgcaggc gctgcttgcc 660 cacctggagg tcctggtcaa ggccaccgcc gtcaaggtgc acctctacga caccgaatgg 720 gggctgcgcg acatgtgcaa catgccgagc acgccctcct tcgagggcat ctactacatc 780 gagcagatcc tgcgccacct cattccgtgc tcgatcatca cgccgctgga ctgtttctgg 840 gagggaagcc agctgttggg tccggaatca gcggtcgtta taccaggcct caaccaacga 900 ctcctgtgga ccaccctgaa tcccgcctct gtgatgcagt atatgaaaca aaagatgtcc 960 gaggaaaaga tcagcttcga cttcgagacc gtggagcagt acatgaagcg tgcggccatt 1020 ggcagtggct acatggagaa gccctgcctg aacccactga atcccaattg cccggacacg 1080 gcaccgaaca agaacagcac ccagccgccg gatgtgggag ccatcctgtc cggaggctgc 1140 tacggttatg ccgcgaagca catgcactgg ccggaggagc tgattgtggg cggacggaag 1200 aggaaccgca gcggacactt gaggaaggcc caggccctgc agtcggtggt gcagctgatg 1260 accgagaagg aaatgtacga ccagtggcag gacaactaca aggtgcacca tcttggatgg 1320 acgcaggaga aggcagcgga ggttttgaac gcctggcagc gcaacttttc gcgggaggtg 1380 gaacagctgc tacgtaaaca gtcgagaatt gccaccaact acgatatcta cgtgttcagc 1440 teggetgeac tggatgaeat eetggeeaag tteteceate ceagegeett gteeattgte 1500 ateggegtgg cegteacegt tttgtatgee ttttgeacge tecteegetg gagggacece 1560 gtccgtggcc agagcagtgt gggcgtggcc ggagttctgc tcatgtgctt cagtaccgcc 1620 gccggattgg gattgtcagc cctgctcggt atcgttttca atgcgctgac cgctgcctat 1680

geggagagea ateggeggga geagaceaag etgattetea agaacgeeag eacecaggtg 1740 gtteegttt tggeeettgg tetgggegte gateacatet teatagtggg acegageate 1800 etgtteagtg eetgeageae egeaggatee ttetttgegg eegeetttat teeggtgeeg 1860 getttgaagg tattetgtet geaggetgee ategtaatgt geteeaattt ggeaggegget 1920 etattggtt tteeggeeat gatttegttg gatetaegga gaegtaeege eggeagggeg 1980 gaeatettet getgetgtt teeggtgtg aaggaacage egaaggtgge aceteeggtg 2040 etgeegetga acaacaacaa egggegggg geeeggeate egaaggetg caacaacaac 2100 agggtgeege tgeeegeea gaateetetg etggaacaag gggeagaeat eeetggage 2160

agtcactcac tggcgtcctt ctccctggca accttcgcct ttcagcacta cactcccttc 2220 ctcatgcgca gctgggtgaa gttcctgacc gttatgggtt tcctggcggc cctcatatcc 2280 agcttgtatg cctccacgcg ccttcaggat ggcctggaca ttattgatct ggtgcccaag 2340

gacagcaacg agcacaagtt cctggatgct caaactcggc tctttggctt ctacagcatg 2400 tatgcggtta cccagggcaa ctttgaatat cccaccagc agcagttgct cagggactac 2460

```
catgatteet ttgtgegggt gecacatgtg ateaagaatg ataaeggtgg aetgeeggae 2520
ttctggctgc tgctcttcag cgagtggctg ggtaatctgc aaaagatatt cgacgaggaa 2580
taccgcgacg gacggctgac caaggagtgc tggttcccaa acgccagcag cgatgccatc 2640
ctggcctaca agctaatcgt gcaaaccggc catgtggaca accccgtgga caaggaactg 2700
gtgctcacca atcgcctggt caacagcgat ggcatcatca accaacgcgc cttctacaac 2760
tatctgtcgg catgggccac caacgacgtc ttcgcctacg gagcttctca gggcaaattg 2820
tatccggaac cgcgccagta ttttcaccaa cccaacgagt acgatcttaa gatacccaag 2880
agtotgocat tggtctacgc tcagatgocc ttttacctcc acggactaac agatacctcg 2940
cagatcaaga ccctgatagg tcatattcgc gacctgagcg tcaagtacga gggcttcggc 3000
ctgcccaact atccatcggg cattcccttc atcttctggg agcagtacat gaccctgcgc 3060
tecteactgg ceatgatect ggeetgegtg etactegeeg ecetggtget ggteteeetg 3120
ctcctgctct ccgtttgggc cgccgttctc gtgatcctca gcgttctggc ctcgctggcc 3180
cagatetttg gggccatgae tetgetggge ateaaactet eggecattee ggcagteata 3240
ctcatcctca gcgtgggcat gatgctgtgc ttcaatgtgc tgatatcact gggcttcatg 3300
acatccgttg gcaaccgaca gcgccgcgtc cagctgagca tgcagatgtc cctgggacca 3360
cttgtccacg gcatgctgac ctccggagtg gccgtgttca tgctctccac gtcgcccttt 3420
gagtttgtga tccggcactt ctgctggctt ctgctggtgg tcttatgcgt tggcgcctgc 3480
aacagcettt tggtgtteec cateetactg ageatggtgg gaeeggagge ggagetggtg 3540
ccgctggagc atccagaccg catatecacg ccctctccgc tgcccgtgcg cagcagcaag 3600
agatcgggca aatcctatgt ggtgcaggga tcgcgatcct cgcgaggcag ctgccagaag 3660
togcatoacc accaccaca agacettaat gatecatege tgacgacgat caccgaggag 3720
ccgcagtcgt ggaagtccag caactcgtcc atccagatgc ccaatgattg gacctaccag 3780
gcccagcagc accaccagca tcagggcccg cccacaacgc ccccgcctcc cttcccgacg 3900
gcctatccgc cggagctgca gagcatcgtg gtgcagccgg aggtgacggt ggagacgacg 3960
cactoggaca gcaacaccac caaggtgacg gccacggcca acatcaaggt ggagctggcc 4020
atgcccggca gggcggtgcg cagctataac tttacgagtt agcactagca ctagttcctg 4080
tagctattag gacgtatctt tagactctag cctaagccgt aaccctattt gtatctgtaa 4140
aatcqatttq tccaqcqqqt ctqctqaqqa tttcqttctc atggattctc atggattctc 4200
atggatgctt aaatggcatg gtaattggca aaatatcaat ttttgtgtct caaaaagatg 4260
cattagctta tggtttcaag atacattttt aaagagtccg ccagatattt atataaaaaa 4320
aatccaaaat cgacgtatcc atgaaaattg aaaagctaag cagacccgta tgtatgtata 4380
tqtqtatgca tgttagttaa tttcccgaag tccggtattt atagcagctg cctt
<210> 6
<213> Drosophila
```

<211> 1285 <212> PRT

<400> 6 Met Asp Arg Asp Ser Leu Pro Arg Val Pro Asp Thr His Gly Asp Val 10 Val Asp Glu Lys Leu Phe Ser Asp Leu Tyr Ile Arg Thr Ser Trp Val 25 Asp Ala Gln Val Ala Leu Asp Gln Ile Asp Lys Gly Lys Ala Arg Gly 40 Ser Arg Thr Ala Ile Tyr Leu Arg Ser Val Phe Gln Ser His Leu Glu 55 60 Thr Leu Gly Ser Ser Val Gln Lys His Ala Gly Lys Val Leu Phe Val 70 75 Ala Ile Leu Val Leu Ser Thr Phe Cys Val Gly Leu Lys Ser Ala Gln 90 85 Ile His Ser Lys Val His Gln Leu Trp Ile Gln Glu Gly Gly Arg Leu 110 105 100 Glu Ala Glu Leu Ala Tyr Thr Gln Lys Thr Ile Gly Glu Asp Glu Ser 125 120 Ala Thr His Gln Leu Leu Ile Gln Thr Thr His Asp Pro Asn Ala Ser 140 130 135

Val Leu His Pro Gln Ala Leu Leu Ala His Leu Glu Val Leu Val Lys 150 155 Ala Thr Ala Val Lys Val His Leu Tyr Asp Thr Glu Trp Gly Leu Arg 170 165 Asp Met Cys Asn Met Pro Ser Thr Pro Ser Phe Glu Gly Ile Tyr Tyr 185 Ile Glu Gln Ile Leu Arg His Leu Ile Pro Cys Ser Ile Ile Thr Pro 200 Leu Asp Cys Phe Trp Glu Gly Ser Gln Leu Leu Gly Pro Glu Ser Ala 215 220 Val Val Ile Pro Gly Leu Asn Gln Arg Leu Leu Trp Thr Thr Leu Asn 230 235 Pro Ala Ser Val Met Gln Tyr Met Lys Gln Lys Met Ser Glu Glu Lys 250 245 Ile Ser Phe Asp Phe Glu Thr Val Glu Gln Tyr Met Lys Arg Ala Ala 270 265 Ile Gly Ser Gly Tyr Met Glu Lys Pro Cys Leu Asn Pro Leu Asn Pro 280 Asn Cys Pro Asp Thr Ala Pro Asn Lys Asn Ser Thr Gln Pro Pro Asp 295 Val Gly Ala Ile Leu Ser Gly Gly Cys Tyr Gly Tyr Ala Ala Lys His 310 315 Met His Trp Pro Glu Glu Leu Ile Val Gly Gly Arg Lys Arg Asn Arg 325 330 Ser Gly His Leu Arg Lys Ala Gln Ala Leu Gln Ser Val Val Gln Leu 345 Met Thr Glu Lys Glu Met Tyr Asp Gln Trp Gln Asp Asn Tyr Lys Val 360 His His Leu Gly Trp Thr Gln Glu Lys Ala Ala Glu Val Leu Asn Ala 375 Trp Gln Arg Asn Phe Ser Arg Glu Val Glu Gln Leu Leu Arg Lys Gln 395 390 Ser Arg Ile Ala Thr Asn Tyr Asp Ile Tyr Val Phe Ser Ser Ala Ala 405 410 Leu Asp Asp Ile Leu Ala Lys Phe Ser His Pro Ser Ala Leu Ser Ile 425 420 Val Ile Gly Val Ala Val Thr Val Leu Tyr Ala Phe Cys Thr Leu Leu 440 445 Arg Trp Arg Asp Pro Val Arg Gly Gln Ser Ser Val Gly Val Ala Gly 455 Val Leu Leu Met Cys Phe Ser Thr Ala Ala Gly Leu Gly Leu Ser Ala 470 475 Leu Leu Gly Ile Val Phe Asn Ala Leu Thr Ala Ala Tyr Ala Glu Ser 490 485 Asn Arg Arg Glu Gln Thr Lys Leu Ile Leu Lys Asn Ala Ser Thr Gln 505 500 Val Val Pro Phe Leu Ala Leu Gly Leu Gly Val Asp His Ile Phe Ile 520 Val Gly Pro Ser Ile Leu Phe Ser Ala Cys Ser Thr Ala Gly Ser Phe 535 Phe Ala Ala Ala Phe Ile Pro Val Pro Ala Leu Lys Val Phe Cys Leu 555 550 Gln Ala Ala Ile Val Met Cys Ser Asn Leu Ala Ala Ala Leu Leu Val 570 565 Phe Pro Ala Met Ile Ser Leu Asp Leu Arg Arg Arg Thr Ala Gly Arg 585 Ala Asp Ile Phe Cys Cys Cys Phe Pro Val Trp Lys Glu Gln Pro Lys

```
Val Ala Pro Pro Val Leu Pro Leu Asn Asn Asn Gly Arg Gly Ala
                                            620
                        615
Arg His Pro Lys Ser Cys Asn Asn Asn Arg Val Pro Leu Pro Ala Gln
                                        635
                    630
Asn Pro Leu Leu Glu Gln Arg Ala Asp Ile Pro Gly Ser Ser His Ser
                645
                                    650
Leu Ala Ser Phe Ser Leu Ala Thr Phe Ala Phe Gln His Tyr Thr Pro
                                                    670
                                665
Phe Leu Met Arg Ser Trp Val Lys Phe Leu Thr Val Met Gly Phe Leu
                            680
Ala Ala Leu Ile Ser Ser Leu Tyr Ala Ser Thr Arg Leu Gln Asp Gly
                        695
                                            700
Leu Asp Ile Ile Asp Leu Val Pro Lys Asp Ser Asn Glu His Lys Phe
                                        715
                    710
Leu Asp Ala Gln Thr Arg Leu Phe Gly Phe Tyr Ser Met Tyr Ala Val
                                    730
                725
Thr Gln Gly Asn Phe Glu Tyr Pro Thr Gln Gln Leu Leu Arg Asp
            740
                                745
Tyr His Asp Ser Phe Arg Val Pro His Val Ile Lys Asn Asp Asn Gly
                            760
       755
Gly Leu Pro Asp Phe Trp Leu Leu Leu Phe Ser Glu Trp Leu Gly Asn
                       775
Leu Gln Lys Ile Phe Asp Glu Glu Tyr Arg Asp Gly Arg Leu Thr Lys
                   790
                                        795
Glu Cys Trp Phe Pro Asn Ala Ser Ser Asp Ala Ile Leu Ala Tyr Lys
                                    810
               805
Leu Ile Val Gln Thr Gly His Val Asp Asn Pro Val Asp Lys Glu Leu
                                825
           820
Val Leu Thr Asn Arg Leu Val Asn Ser Asp Gly Ile Ile Asn Gln Arg
                            840
Ala Phe Tyr Asn Tyr Leu Ser Ala Trp Ala Thr Asn Asp Val Phe Ala
                                            860
                       855
Tyr Gly Ala Ser Gln Gly Lys Leu Tyr Pro Glu Pro Arg Gln Tyr Phe
                                        875
                   870
His Gln Pro Asn Glu Tyr Asp Leu Lys Ile Pro Lys Ser Leu Pro Leu
                                    890
               885
Val Tyr Ala Gln Met Pro Phe Tyr Leu His Gly Leu Thr Asp Thr Ser
                                905
           900
Gln Ile Lys Thr Leu Ile Gly His Ile Arg Asp Leu Ser Val Lys Tyr
                            920
                                                925
        915
Glu Gly Phe Gly Leu Pro Asn Tyr Pro Ser Gly Ile Pro Phe Ile Phe
                                            940
                       935
Trp Glu Gln Tyr Met Thr Leu Arg Ser Ser Leu Ala Met Ile Leu Ala
                                        955
                   950
Cys Val Leu Leu Ala Ala Leu Val Leu Val Ser Leu Leu Leu Ser
                                    970
               965
Val Trp Ala Ala Val Leu Val Ile Leu Ser Val Leu Ala Ser Leu Ala
                                985
           980
Gln Ile Phe Gly Ala Met Thr Leu Leu Gly Ile Lys Leu Ser Ala Ile
                                                1005
        995
                            1000
Pro Ala Val Ile Leu Ile Leu Ser Val Gly Met Met Leu Cys Phe Asn
                        1015
                                            1020
Val Leu Ile Ser Leu Gly Phe Met Thr Ser Val Gly Asn Arg Gln Arg
                                        1035
                   1030
Arg Val Gln Leu Ser Met Gln Met Ser Leu Gly Pro Leu Val His Gly
                                    1050
               1045
Met Leu Thr Ser Gly Val Ala Val Phe Met Leu Ser Thr Ser Pro Phe
                                1065
```

```
Glu Phe Val Ile Arg His Phe Cys Trp Leu Leu Val Val Leu Cys
        1075
                            1080
                                                 1085
Val Gly Ala Cys Asn Ser Leu Leu Val Phe Pro Ile Leu Leu Ser Met
                        1095
                                             1100
Val Gly Pro Glu Ala Glu Leu Val Pro Leu Glu His Pro Asp Arg Ile
                    1110
                                         1115
Ser Thr Pro Ser Pro Leu Pro Val Arg Ser Ser Lys Arg Ser Gly Lys
                1125
                                     1130
                                                          1135
Ser Tyr Val Val Gln Gly Ser Arg Ser Ser Arg Gly Ser Cys Gln Lys
                                                      1150
            1140
                                 1145
Ser His His His His Lys Asp Leu Asn Asp Pro Ser Leu Thr Thr
                             1160
                                                 1165
        1155
Ile Thr Glu Glu Pro Gln Ser Trp Lys Ser Ser Asn Ser Ser Ile Gln
                        1175
    1170
Met Pro Asn Asp Trp Thr Tyr Gln Pro Arg Glu Gln Arg Pro Ala Ser
                    1190
                                         1195
1185
Tyr Ala Ala Pro Pro Pro Ala Tyr His Lys Ala Ala Ala Gln Gln His
                1205
                                     1210
His Gln His Gln Gly Pro Pro Thr Thr Pro Pro Pro Pro Phe Pro Thr
                                 1225
                                                      1230
            1220
Ala Tyr Pro Pro Glu Leu Gln Ser Ile Val Val Gln Pro Glu Val Thr
                            1240
                                                 1245
        1235
Val Glu Thr Thr His Ser Asp Ser Asn Thr Thr Lys Val Thr Ala Thr
                        1255
                                             1260
Ala Asn Ile Lys Val Glu Leu Ala Met Pro Gly Arg Ala Val Arg Ser
                                         1275
1265
                    1270
Tyr Asn Phe Thr Ser
                1285
<210> 7
<211> 345
<212> DNA
<213> Mosquito
<220>
<221> misc_feature
<222> 114, 225, 261
<223> n = A, T, C \text{ or } G
<400> 7
aaggtccatc agctttggat acaggaaggt ggttcgctcg agcatgagct agcctacacg 60
cagaaatcgc tcggcgagat ggactcctcc acgcaccagc tgctaatcca aacncccaaa 120
gatatggacg cctcgatact gcacccgaac gcgctactga cgcacctgga cgtggtgaag 180
aaagcgatct cggtgacggt gcacatgtac gacatcacgt ggagnctcaa ggacatgtgc 240
tactcgccca gcataccgag nttcgatacg cactttatcg agcagatctt cgagaacatc 300
ataccgtgcg cgatcatcac gccgctggat tgcttttggg aggga
<210> 8
<211> 115
<212> PRT
<213> Mosquito
<220>
<221> VARIANT
<222> 75, 87
<223> Xaa = Any Amino Acid
```

```
<400> 8
Lys Val His Gln Leu Trp Ile Gln Glu Gly Gly Ser Leu Glu His Glu
                                    10
Leu Ala Tyr Thr Gln Lys Ser Leu Gly Glu Met Asp Ser Ser Thr His
                                25
            20
Gln Leu Leu Ile Gln Thr Pro Lys Asp Met Asp Ala Ser Ile Leu His
                            40
Pro Asn Ala Leu Leu Thr His Leu Asp Val Val Lys Lys Ala Ile Ser
                                            60
Val Thr Val His Met Tyr Asp Ile Thr Trp Xaa Leu Lys Asp Met Cys
                    70
                                        75
Tyr Ser Pro Ser Ile Pro Xaa Phe Asp Thr His Phe Ile Glu Gln Ile
                                    90
Phe Glu Asn Ile Ile Pro Cys Ala Ile Ile Thr Pro Leu Asp Cys Phe
                                105
                                                    110
            100
Trp Glu Gly
        115
<210> 9
<211> 5187
<212> DNA
<213> Mouse
<400> 9
gggtctgtca cccggagccg gagtccccgg cggccagcag cgtcctcgcg agccgagcgc 60
ccaggegege ceggageege eggeggegge ggeaacatgg ceteggetgg taaegeegee 120
ggggccctgg gcaggcaggc cggcggcggg aggcgcagac ggaccggggg accgcaccgc 180
geogegeegg acegggacta tetgeacegg eccagetact gegacgeege ettegetetg 240
gagcagattt ccaaggggaa ggctactggc cggaaagcgc cgctgtggct gagagcgaag 300
tttcagagac tcttatttaa actgggttgt tacattcaaa agaactgcgg caagtttttg 360
gttgtgggtc tcctcatatt tggggccttc gctgtgggat taaaggcagc taatctcgag 420
accaacgtgg aggagctgtg ggtggaagtt ggtggacgag tgagtcgaga attaaattat 480
acceptcaga agataggaga agaggetatg tttaateete aacteatgat acagaeteea 540
aaagaagaag gcgctaatgt tctgaccaca gaggctctcc tgcaacacct ggactcagca 600
ctccaggcca gtcgtgtgca cgtctacatg tataacaggc aatggaagtt ggaacatttg 660
tgctacaaat caggggaact tatcacggag acaggttaca tggatcagat aatagaatac 720
ctttaccctt gcttaatcat tacacctttg gactgcttct gggaaggggc aaagctacag 780
tccgggacag catacctcct aggtaagcct cctttacggt ggacaaactt tgaccccttg 840
gaattcctag aagagttaaa gaaaataaac taccaagtgg acagctggga ggaaatgctg 900
aataaagccg aagttggcca tgggtacatg gaccggcctt gcctcaaccc agccgaccca 960
gattgccctg ccacagcccc taacaaaaat tcaaccaaac ctcttgatgt ggcccttgtt 1020
ttgaatggtg gatgtcaagg tttatccagg aagtatatgc attggcagga ggagttgatt 1080
gtgggtggta ccgtcaagaa tgccactgga aaacttgtca gcgctcacgc cctgcaaacc 1140
atgttccagt taatgactcc caagcaaatg tatgaacact tcaggggcta cgactatgtc 1200
tctcacatca actggaatga agacagggca gccgccatcc tggaggcctg gcagaggact 1260
tacgtggagg tggttcatca aagtgtcgcc ccaaactcca ctcaaaaggt gcttcccttc 1320
acaaccacga ccctggacga catcctaaaa tccttctctg atgtcagtgt catccgagtg 1380
gccagcggct acctactgat gcttgcctat gcctgtttaa ccatgctgcg ctgggactgc 1440
tccaagtccc agggtgccgt ggggctggct ggcgtcctgt tggttgcgct gtcagtggct 1500
gcaggattgg gcctctgctc cttgattggc atttctttta atgctgcgac aactcaggtt 1560
ttgccgtttc ttgctcttgg tgttggtgtg gatgatgtct tcctcctggc ccatgcattc 1620
agtgaaacag gacagaataa gaggattcca tttgaggaca ggactgggga gtgcctcaag 1680
cgcaccggag ccagcgtggc cctcacctcc atcagcaatg tcaccgcctt cttcatggcc 1740
gcattgatcc ctatccctgc cctgcgagcg ttctccctcc aggctgctgt ggtggtggta 1800
ttcaattttg ctatggttct gctcattttt cctgcaattc tcagcatgga tttatacaga 1860
cgtgaggaca gaagattgga tattttctgc tgtttcacaa gcccctgtgt cagcagggtg 1920
attcaagttg agccacaggc ctacacagag cctcacagta acacceggta cagcceccca 1980
```

ccccataca ccagccacag cttcgcccac gaaacccata tcactatgca gtccaccgtt 2040

cagctccgca	cagagtatga	ccctcacacg	cacgtgtact	acaccaccgc	cgagccacgc	2100
tctgagatct	ctgtacagcc	tgttaccgtc	acccaggaca	acctcagctg	tcagagtccc	2160
gagagcacca	gctctaccag	ggacctgctc	tcccagttct	cagactccag	cctccactgc	2220
ctcgagcccc	cctgcaccaa	gtggacactc	tcttcgtttg	cagagaagca	ctatgctcct	2280
ttcctcctga	aacccaaagc	caaggttgtg	gtaatccttc	ttttcctggg	cttgctgggg	2340
gtcagccttt	atgggaccac	ccgagtgaga	gacgggctgg	acctcacgga	cattgttccc	2400
cqqqaaacca	gagaatatga	cttcatagct	gcccagttca	agtacttctc	tttctacaac	2460
atgtatatag	tcacccagaa	agcagactac	ccgaatatcc	agcacctact	ttacgacctt	2520
cataagagtt	tcaqcaatqt	gaagtatgtc	atgctggagg	agaacaagca	acttccccaa	2580
atgtggctgc	actactttag	agactggctt	caaggacttc	aggatgcatt	tgacagtgac	2640
taggaaactg	ggaggatcat	gccaaacaat	tataaaaatq	gatcagatga	cggggtcctc	2700
gcttacaaac	tectagtaca	gactggcagc	cqaqacaaqc	ccatcgacat	tagtcagttg	2760
actaaacagc	gtctggtaga	cacagatage	atcattaatc	cgagcgcttt	ctacatctac	2820
ctgaccgctt	gggtcagcaa	cgaccctgta	acttacacta	cctcccaqqc	caacatccgg	2880
cctcaccaac	cadaataaat	ccatgacaaa	gccgactaca	taccagagac	caggctgaga	2940
atcccaccac	cagageceat	cgagtacgct	cagttccctt	tctacctcaa	cggcctacga	3000
gacactcag	actttataa	accatacaa	aaagtgagag	tcatctgtaa	caactatacg	3060
aggataggag	tatacaaata	ccccaataac	taccccttcc	tattatagaa	gcaatacatc	3120
ageetgggae	agtecageta	ccccaacggc	accetece	taacctacac	gtttctagtg	3180
tagagagatat	taataataa	gccatccacc	agegeggege	ttatcataat	cctaactcta	3240
tgegeagtet	ceeteetgaa	gatgatgagg	geegggaeea	tcaactgac	cctggctctg	3300
atgaeegttg	agetettigg	tattagatag	gazatagaat	teaagetgag	tgctgtgcct	3360
gtggteatee	tgattgcatc	rgitggeate	ggageggage	teategetea	cgtggctttg	3430
gcctttctga	cagecattgg	ggacaagaac	cacayyycta	atatagtast	ggaacacatg	3420
tttgctcccg	ttctggacgg	tgetgtgtee	actetgetgg	gracigat	gcttgcaggg	3400
tccgaatttg	atttcattgt	cagatacttc	tttgeegtee	tggecattet	caccgtcttg	3540
ggggttctca	atggactggt	tctgctgcct	gtcctcttat	cettetttgg	accgtgtcct	3600
gaggtgtctc	cagccaatgg	cctaaaccga	ctgcccactc	cttcgcctga	gccgcctcca	3660
agtgtcgtcc	ggtttgccgt	gcctcctggt	cacacgaaca	atgggtctga	ttcctccgac	3/20
tcggagtaca	gctctcagac	cacggtgtct	ggcatcagtg	aggageteag	gcaatacgaa	3780
gcacagcagg	gtgccggagg	ccctgcccac	caagtgattg	tggaagccac	agaaaaccct	3840
gtctttgccc	ggtccactgt	ggtccatccg	gactccagac	atcagcctcc	cttgacccct	3900
cggcaacagc	cccacctgga	ctctggctcc	ttgtcccctg	gacggcaagg	ccagcagcct	3960
cgaagggatc	cccctagaga	aggcttgcgg	ccaccccct	acagaccgcg	cagagacgct	4020
tttgaaattt	ctactgaagg	gcattctggc	cctagcaata	gggaccgctc	agggccccgt	4080
ggggcccgtt	ctcacaaccc	tcggaaccca	acgtccaccg	ccatgggcag	ctctgtgccc	4140
agctactgcc	agcccatcac	cactgtgacg	gcttctgctt	cggtgactgt	tgctgtgcat	4200
ccccgcctg	gacctgggcg	caacccccga	ggggggccct	gtccaggcta	tgagagctac	4260
cctgagactg	atcacggggt	atttgaggat	cctcatgtgc	cttttcatgt	caggtgtgag	4320
aggagggact	caaaggtgga	ggtcatagag	ctacaggacg	tggaatgtga	ggagaggccg	4380
tgggggagca	gctccaactg	agggtaatta	aaatctgaag	caaagaggcc	aaagattgga	4440
aagccccgcc	cccacctctt	tccagaactg	cttgaagaga	actgcttgga	attatgggaa	4500
ggcagttcat	tgttactgta	actgattgta	ttattkkgtg	aaatatttct	ataaatattt	4560
aaraggtgta	cacatgtaat	atacatggaa	atgctgtaca	gtctatttcc	tggggcctct	4620
ccactcctqc	cccagagtgg	ggagaccaca	ggggcccttt	cccctgtgta	cattggtctc	4680
tgtgccacaa	ccaagcttaa	cttagtttta	aaaaaaatct	cccagcatat	gtcgctgctg	4740
cttaaatatt	gtataattta	cttgtataat	tctatgcaaa	tattgcttat	gtaataggat	4800
tatttqtaaa	ggtttctgtt	taaaatattt	taaatttgca	tatcacaacc	ctgtggtagg	4860
atgaattgtt	actgttaact	tttgaacacq	ctatgcgtgg	taattgttta	acgagcagac	4920
atgaagaaaa	caggttaatc	ccagtqqctt	ctctaggggt	agttgtatat	ggttcgcatg	4980
gatagatata	tatatacata	tgactttcca	atqtactqta	tigtgattta	ttgttgttgt	5040
tactattatt	attcatttta	atattttaa	ttgctttgta	tgatcttagc	tctggcctag	5100
atagactaga	aaggtccagg	tctttttcta	tcqtqatqct	ggtggaaagg	tgaccccaat	5160
	attctctggg		3 3 3	-5 55 55	-	5187

<210> 10 <211> 1434 <212> PRT

<213> Mouse

<400> 10 Met Ala Ser Ala Gly Asn Ala Ala Gly Ala Leu Gly Arg Gln Ala Gly 10 Gly Gly Arg Arg Arg Thr Gly Gly Pro His Arg Ala Ala Pro Asp Arg Asp Tyr Leu His Arg Pro Ser Tyr Cys Asp Ala Ala Phe Ala Leu Glu Gln Ile Ser Lys Gly Lys Ala Thr Gly Arg Lys Ala Pro Leu Trp 55 Leu Arg Ala Lys Phe Gln Arg Leu Leu Phe Lys Leu Gly Cys Tyr Ile 75 Gln Lys Asn Cys Gly Lys Phe Leu Val Val Gly Leu Leu Ile Phe Gly 90 Ala Phe Ala Val Gly Leu Lys Ala Ala Asn Leu Glu Thr Asn Val Glu 100 105 Glu Leu Trp Val Glu Val Gly Gly Arg Val Ser Arg Glu Leu Asn Tyr 120 115 Thr Arg Gln Lys Ile Gly Glu Glu Ala Met Phe Asn Pro Gln Leu Met 135 Ile Gln Thr Pro Lys Glu Glu Gly Ala Asn Val Leu Thr Thr Glu Ala 150 155 Leu Leu Gln His Leu Asp Ser Ala Leu Gln Ala Ser Arg Val His Val 170 165 Tyr Met Tyr Asn Arg Gln Trp Lys Leu Glu His Leu Cys Tyr Lys Ser 185 Gly Glu Leu Ile Thr Glu Thr Gly Tyr Met Asp Gln Ile Ile Glu Tyr 200 Leu Tyr Pro Cys Leu Ile Ile Thr Pro Leu Asp Cys Phe Trp Glu Gly 220 215 Ala Lys Leu Gln Ser Gly Thr Ala Tyr Leu Leu Gly Lys Pro Pro Leu 235 230 Arg Trp Thr Asn Phe Asp Pro Leu Glu Phe Leu Glu Glu Leu Lys Lys 245 250 Ile Asn Tyr Gln Val Asp Ser Trp Glu Glu Met Leu Asn Lys Ala Glu 265 Val Gly His Gly Tyr Met Asp Arg Pro Cys Leu Asn Pro Ala Asp Pro 280 Asp Cys Pro Ala Thr Ala Pro Asn Lys Asn Ser Thr Lys Pro Leu Asp 300 295 Val Ala Leu Val Leu Asn Gly Gly Cys Gln Gly Leu Ser Arg Lys Tyr 315 310 Met His Trp Gln Glu Glu Leu Ile Val Gly Gly Thr Val Lys Asn Ala 330 325 Thr Gly Lys Leu Val Ser Ala His Ala Leu Gln Thr Met Phe Gln Leu 345 340 Met Thr Pro Lys Gln Met Tyr Glu His Phe Arg Gly Tyr Asp Tyr Val 360 Ser His Ile Asn Trp Asn Glu Asp Arg Ala Ala Ala Ile Leu Glu Ala 375 380 Trp Gln Arg Thr Tyr Val Glu Val Val His Gln Ser Val Ala Pro Asn 395 390 Ser Thr Gln Lys Val Leu Pro Phe Thr Thr Thr Leu Asp Asp Ile 410 405 Leu Lys Ser Phe Ser Asp Val Ser Val Ile Arg Val Ala Ser Gly Tyr 425 430 Leu Leu Met Leu Ala Tyr Ala Cys Leu Thr Met Leu Arg Trp Asp Cys 440

Ser Lys Ser Gln Gly Ala Val Gly Leu Ala Gly Val Leu Leu Val Ala Leu Ser Val Ala Ala Gly Leu Gly Leu Cys Ser Leu Ile Gly Ile Ser Phe Asn Ala Ala Thr Thr Gln Val Leu Pro Phe Leu Ala Leu Gly Val Gly Val Asp Asp Val Phe Leu Leu Ala His Ala Phe Ser Glu Thr Gly Gln Asn Lys Arg Ile Pro Phe Glu Asp Arg Thr Gly Glu Cys Leu Lys Arg Thr Gly Ala Ser Val Ala Leu Thr Ser Ile Ser Asn Val Thr Ala Phe Phe Met Ala Ala Leu Ile Pro Ile Pro Ala Leu Arg Ala Phe Ser Leu Gln Ala Ala Val Val Val Phe Asn Phe Ala Met Val Leu Leu Ile Phe Pro Ala Ile Leu Ser Met Asp Leu Tyr Arg Arg Glu Asp Arg Arg Leu Asp Ile Phe Cys Cys Phe Thr Ser Pro Cys Val Ser Arg Val Ile Gln Val Glu Pro Gln Ala Tyr Thr Glu Pro His Ser Asn Thr Arg Tyr Ser Pro Pro Pro Tyr Thr Ser His Ser Phe Ala His Glu Thr His Ile Thr Met Gln Ser Thr Val Gln Leu Arg Thr Glu Tyr Asp Pro His Thr His Val Tyr Tyr Thr Ala Glu Pro Arg Ser Glu Ile Ser Val Gln Pro Val Thr Val Thr Gln Asp Asn Leu Ser Cys Gln Ser Pro Glu Ser Thr Ser Ser Thr Arg Asp Leu Leu Ser Gln Phe Ser Asp Ser Ser Leu His Cys Leu Glu Pro Pro Cys Thr Lys Trp Thr Leu Ser Ser Phe Ala Glu Lys His Tyr Ala Pro Phe Leu Leu Lys Pro Lys Ala Lys Val Val Ile Leu Leu Phe Leu Gly Leu Leu Gly Val Ser Leu Tyr Gly Thr Thr Arg Val Arg Asp Gly Leu Asp Leu Thr Asp Ile Val Pro Arg Glu Thr Arg Glu Tyr Asp Phe Ile Ala Ala Gln Phe Lys Tyr Phe Ser Phe Tyr Asn Met Tyr Ile Val Thr Gln Lys Ala Asp Tyr Pro Asn Ile Gln His Leu Leu Tyr Asp Leu His Lys Ser Phe Ser Asn Val Lys Tyr Val Met Leu Glu Glu Asn Lys Gln Leu Pro Gln Met Trp Leu His Tyr Phe Arg Asp Trp Leu Gln Gly Leu Gln Asp Ala Phe Asp Ser Asp Trp Glu Thr Gly Arg Ile Met Pro Asn Asn Tyr Lys Asn Gly Ser Asp Asp Gly Val Leu Ala Tyr Lys Leu Leu Val Gln Thr Gly Ser Arg Asp Lys Pro Ile Asp Ile Ser Gln Leu Thr Lys Gln Arg Leu Val Asp Ala Asp Gly Ile Ile Asn Pro Ser Ala Phe Tyr Ile Tyr Leu Thr Ala Trp

```
Val Ser Asn Asp Pro Val Ala Tyr Ala Ala Ser Gln Ala Asn Ile Arg
                            920
                                                925
        915
Pro His Arg Pro Glu Trp Val His Asp Lys Ala Asp Tyr Met Pro Glu
                       935
                                            940
Thr Arg Leu Arg Ile Pro Ala Ala Glu Pro Ile Glu Tyr Ala Gln Phe
                    950
                                        955
Pro Phe Tyr Leu Asn Gly Leu Arg Asp Thr Ser Asp Phe Val Glu Ala
                                    970
               965
Ile Glu Lys Val Arg Val Ile Cys Asn Asn Tyr Thr Ser Leu Gly Leu
                                                    990
                                985
Ser Ser Tyr Pro Asn Gly Tyr Pro Phe Leu Phe Trp Glu Gln Tyr Ile
        995
                            1000
                                                1005
Ser Leu Arg His Trp Leu Leu Leu Ser Ile Ser Val Val Leu Ala Cys
                        1015
                                            1020
Thr Phe Leu Val Cys Ala Val Phe Leu Leu Asn Pro Trp Thr Ala Gly
                                        1035
                                                            1040
                    1030
Ile Ile Val Met Val Leu Ala Leu Met Thr Val Glu Leu Phe Gly Met
                                    1050
                                                        1055
                1045
Met Gly Leu Ile Gly Ile Lys Leu Ser Ala Val Pro Val Val Ile Leu
           1060
                                1065
                                                    1070
Ile Ala Ser Val Gly Ile Gly Val Glu Phe Thr Val His Val Ala Leu
                                                1085
       1075
                            1080
Ala Phe Leu Thr Ala Ile Gly Asp Lys Asn His Arg Ala Met Leu Ala
                        1095
                                            1100
Leu Glu His Met Phe Ala Pro Val Leu Asp Gly Ala Val Ser Thr Leu
                   1110
                                        1115
1105
Leu Gly Val Leu Met Leu Ala Gly Ser Glu Phe Asp Phe Ile Val Arg
                                    1130
               1125
Tyr Phe Phe Ala Val Leu Ala Ile Leu Thr Val Leu Gly Val Leu Asn
                                1145
                                                    1150
           1140
Gly Leu Val Leu Leu Pro Val Leu Leu Ser Phe Phe Gly Pro Cys Pro
                           1160
                                                1165
       1155
Glu Val Ser Pro Ala Asn Gly Leu Asn Arg Leu Pro Thr Pro Ser Pro
                       1175
                                            1180
    1170
Glu Pro Pro Pro Ser Val Val Arg Phe Ala Val Pro Pro Gly His Thr
                   1190
                                        1195
Asn Asn Gly Ser Asp Ser Ser Asp Ser Glu Tyr Ser Ser Gln Thr Thr
                                                        1215
               1205
                                    1210
Val Ser Gly Ile Ser Glu Glu Leu Arg Gln Tyr Glu Ala Gln Gly
                                1225
                                                    1230
           1220
Ala Gly Gly Pro Ala His Gln Val Ile Val Glu Ala Thr Glu Asn Pro
                                                1245
                            1240
       1235
Val Phe Ala Arg Ser Thr Val Val His Pro Asp Ser Arg His Gln Pro
                       1255
                                            1260
Pro Leu Thr Pro Arg Gln Gln Pro His Leu Asp Ser Gly Ser Leu Ser
                    1270
                                        1275
Pro Gly Arg Gln Gly Gln Gln Pro Arg Arg Asp Pro Pro Arg Glu Gly
                                    1290
                                                        1295
               1285
Leu Arg Pro Pro Pro Tyr Arg Pro Arg Arg Asp Ala Phe Glu Ile Ser
                                                    1310
           1300
                                1305
Thr Glu Gly His Ser Gly Pro Ser Asn Arg Asp Arg Ser Gly Pro Arg
                            1320
                                                1325
        1315
Gly Ala Arg Ser His Asn Pro Arg Asn Pro Thr Ser Thr Ala Met Gly
                                            1340
                       1335
Ser Ser Val Pro Ser Tyr Cys Gln Pro Ile Thr Thr Val Thr Ala Ser
                                        1355
                    1350
Ala Ser Val Thr Val Ala Val His Pro Pro Pro Gly Pro Gly Arg Asn
                                    1370
                1365
```

```
Pro Arg Gly Gly Pro Cys Pro Gly Tyr Glu Ser Tyr Pro Glu Thr Asp
                                                     1390
                                1385
            1380
His Gly Val Phe Glu Asp Pro His Val Pro Phe His Val Arg Cys Glu
                                                 1405
        1395
                            1400
Arg Arg Asp Ser Lys Val Glu Val Ile Glu Leu Gln Asp Val Glu Cys
                        1415
                                             1420
Glu Glu Arg Pro Trp Gly Ser Ser Ser Asn
                    1430
<210> 11
<211> 11
<212> PRT
<213> Artificial Sequence
<220>
<223> Peptide
<400> 11
Ile Ile Thr Pro Leu Asp Cys Phe Trp Glu Gly
                 5
<210> 12
<211> 5
<212> PRT
<213> Artificial Sequence
<220>
<223> Peptide
<400> 12
Leu Ile Val Gly Gly
1
<210> 13
<211> 7
<212> PRT
<213> Artificial Sequence
<220>
<223> Peptide
<400> 13
Pro Phe Phe Trp Glu Gln Tyr
<210> 14
<211> 28
<212> DNA
<213> Artificial Sequence
<220>
<223> Nucleic acid primer
<221> misc_feature
<222> 16, 25
```

```
\langle 223 \rangle n = A,T,C or G
<400> 14
                                                                       28
ggacgaattc aargtncayc arytntgg
<210> 15
<211> 26
<212> DNA
<213> Artificial Sequence
<220>
<223> Nucleic acid primer
<221> misc_feature
<222> 24
<223> n = A, T, C or G
<400> 15
                                                                       26
ggacgaattc cytcccaraa rcantc
<210> 16
<211> 27
<212> DNA
<213> Artificial Sequence
<220>
<223> Nucleic acid primer
<221> misc_feature
<222> 13, 16
<223> n = A, T, C or G
<400> 16
                                                                       27
ggacgaattc ytngantgyt tytggga
<210> 17
<211> 31
<212> DNA
<213> Artificial Sequence
<220>
<223> Nucleic acid primer
<221> misc_feature
<222> 20
\langle 223 \rangle n = A,T,C or G
<400> 17
                                                                       31
cataccagcc aagcttgtcn ggccartgca t
<210> 18
<211> 5288
<212> DNA
<213> Homo sapiens
<220>
<223> Nucleic acid primer
<400> 18
```

gaattccggg gaccgcaagg agtgccgcgg aagcgcccga aggacaggct cgctcggcgc 60 gccggctctc gctcttccgc gaactggatg tgggcagcgg cggccgcaga gacctcggga 120 ccccgcgca atgtggcaat ggaaggcgca gggtctgact ccccggcagc ggccgcggcc 180 gcagcggcag cagcgcccgc cgtgtgagca gcagcagcgg ctggtctgtc aaccggagcc 240 cgagcccgag cagcctgcgg ccagcagcgt cctcgcaagc cgagcgccca ggcgcgccag 300 gagecegeag cageggeage agegegeegg geegeeeggg aageeteegt eeeeggegg 360 geggeggegg eggeggegge aacatggeet eggetggtaa egeegeegag eeceaggaee 420 gcggcggcgg cggcagcggc tgtatcggtg ccccgggacg gccggctgga ggcgggaggc 480 gcagacggac gggggggctg cgccgtgctg ccgcgccgga ccgggactat ctgcaccggc 540 ccagctactg cgacgccgcc ttcgctctgg agcagatttc caaggggaag gctactggcc 600 ggaaagcgcc actgtggctg agagcgaagt ttcagagact cttatttaaa ctgggttgtt 660 acattcaaaa aaactgcggc aagttcttgg ttgtgggcct cctcatattt ggggccttcg 720 cggtgggatt aaaagcagcg aacctcgaga ccaacgtgga ggagctgtgg gtggaagttg 780 gaggacgagt aagtcgtgaa ttaaattata ctcgccagaa gattggagaa gaggctatgt 840 ttaatcctca actcatgata cagaccccta aagaagaagg tgctaatgtc ctgaccacag 900 aagcgctcct acaacacctg gactcggcac tccaggccag ccgtgtccat gtatacatgt 960 acaacaggca gtggaaattg gaacatttgt gttacaaatc aggagagctt atcacagaaa 1020 caggttacat ggatcagata atagaatatc tttacccttg tttgattatt acacctttgg 1080 actgcttctg ggaaggggcg aaattacagt ctgggacagc atacctccta ggtaaacctc 1140 ctttgcggtg gacaaacttc gaccctttgg aattcctgga agagttaaag aaaataaact 1200 atcaagtgga cagctgggag gaaatgctga ataaggctga ggttggtcat ggttacatgg 1260 accgcccctg cctcaatccg gccgatccag actgccccgc cacagccccc aacaaaaatt 1320 caaccaaacc tettgatatg geeettgttt tgaatggtgg atgteatgge ttatecagaa 1380 agtatatgca ctggcaggag gagttgattg tgggtggcac agtcaagaac agcactggaa 1440 aactcgtcag cgcccatgcc ctgcagacca tgttccagtt aatgactccc aagcaaatgt 1500 acgagcactt caaggggtac gagtatgtct cacacatcaa ctggaacgag gacaaagcgg 1560 cagccatcct ggaggcctgg cagaggacat atgtggaggt ggttcatcag agtgtcgcac 1620 agaactccac tcaaaaggtg ctttccttca ccaccacgac cctggacgac atcctgaaat 1680 ccttctctga cgtcagtgtc atccgcgtgg ccagcggcta cttactcatg ctcgcctatg 1740 cctgtctaac catgctgcgc tgggactgct ccaagtccca gggtgccgtg gggctggctg 1800 gcgtcctgct ggttgcactg tcagtggctg caggactggg cctgtgctca ttgatcggaa 1860 tttcctttaa cgctgcaaca actcaggttt tgccatttct cgctcttggt gttggtgtgg 1920 atgatgtttt tcttctggcc cacgccttca gtgaaacagg acagaataaa agaatccctt 1980 ttgaggacag gaccggggag tgcctgaagc gcacaggagc cagcgtggcc ctcacgtcca 2040 tcagcaatgt cacagcette ttcatggeeg egttaateee aatteeeget etgegggegt 2100 tctccctcca ggcagcggta gtagtggtgt tcaattttgc catggttctg ctcatttttc 2160 ctgcaattct cagcatggat ttatatcgac gcgaggacag gagactggat attttctgct 2220 gttttacaag cccctgcgtc agcagagtga ttcaggttga acctcaggcc tacaccgaca 2280 cacacqacaa tacccgctac agccccccac ctccctacag cagccacagc tttgcccatg 2340 aaacgcagat taccatgcag tccactgtcc agctccgcac ggagtacgac ccccacacgc 2400 acgtgtacta caccaccgct gagccgcgct ccgagatctc tgtgcagccc gtcaccgtga 2460 cacaggacac cctcagctgc cagagcccag agagcaccag ctccacaagg gacctgctct 2520 cccagttctc cgactccagc ctccactgcc tcgagccccc ctgtacgaag tggacactct 2580 catcttttgc tgagaagcac tatgctcctt tcctcttgaa accaaaagcc aaggtagtgg 2640 tgatcttcct ttttctgggc ttgctggggg tcagccttta tggcaccacc cgagtgagag 2700 acgggctgga ccttacggac attgtacctc gggaaaccag agaatatgac tttattgctg 2760 cacaattcaa atacttttct ttctacaaca tgtatatagt cacccagaaa gcagactacc 2820 cgaatatcca gcacttactt tacgacctac acaggagttt cagtaacgtg aagtatgtca 2880 tgttggaaga aaacaaacag cttcccaaaa tgtggctgca ctacttcaga gactggcttc 2940 agggacttca ggatgcattt gacagtgact gggaaaccgg gaaaatcatg ccaaacaatt 3000 acaagaatgg atcagacgat ggagtccttg cctacaaact cctggtgcaa accggcagcc 3060 gcgataagcc catcgacatc agccagttga ctaaacagcg tctggtggat gcagatggca 3120 tcattaatcc cagcoctttc tacatctacc tgacggcttg ggtcagcaac gaccccgtcg 3180 cgtatgctgc ctcccaggcc aacatccggc cacaccgacc agaatgggtc cacgacaaag 3240 ccgactacat gcctgaaaca aggctgagaa tcccggcagc agagcccatc gagtatgccc 3300 agttcccttt ctacctcaac gggttgcggg acacctcaga ctttgtggag gcaattgaaa 3360 aagtaaggac catctgcagc aactatacga gcctggggct gtccagttac cccaacggct 3420 accepttect ettetgggag cagtacateg geeteegeea etggetgetg etgtteatea 3480 gegtggtgtt ggeetgeaca tteetegtgt gegetgtett cettetgaac eeetggaegg 3540

```
ccgggatcat tgtgatggtc ctggcgctga tgacggtcga gctgttcggc atgatgggcc 3600
tcatcggaat caagetcagt geegtgeeeg tggtcateet gatcgettet gttggcatag 3660
gagtggagtt caccgttcac gttgctttgg cctttctgac ggccatcggc gacaagaacc 3720
gcagggctgt gcttgccctg gagcacatgt ttgcacccgt cctggatggc gccgtgtcca 3780
ctctgctggg agtgctgatg ctggcgggat ctgagttcga cttcattgtc aggtatttct 3840
ttgctgtgct ggcgatcctc accatcctcg gcgttctcaa tgggctggtt ttgcttcccg 3900
tgcttttgtc tttctttgga ccatatcctg aggtgtctcc agccaacggc ttgaaccgcc 3960
tgcccacacc ctcccctgag ccaccccca gcgtggtccg cttcgccatg ccgcccggcc 4020
acacgcacag cgggtctgat tcctccgact cggagtatag ttcccagacg acagtgtcag 4080
gcctcagcga ggagcttcgg cactacgagg cccagcaggg cgcgggaggc cctgcccacc 4140
aagtgatcgt ggaagccaca gaaaaccccg tcttcgccca ctccactgtg gtccatcccg 4200
aatccaggca tcacccaccc tcgaacccga gacagcagcc ccacctggac tcagggtccc 4260
tgcctcccgg acggcaaggc cagcagccc gcagggaccc ccccagagaa ggcttgtggc 4320
cacccctcta cagaccgcgc agagacgctt ttgaaatttc tactgaaggg cattctggcc 4380
ctagcaatag ggcccgctgg ggccctcgcg gggcccgttc tcacaaccct cggaacccag 4440
cgtccactgc catgggcagc tccgtgcccg gctactgcca gcccatcacc actgtgacgg 4500
cttctgcctc cgtgactgtc gccgtgcacc cgccgcctgt ccctgggcct gggcggaacc 4560
cccgagggg actctgccca ggctaccctg agactgacca cggcctgttt gaggaccccc 4620
acgtgccttt ccacgtccgg tgtgagagga gggattcgaa ggtggaagtc attgagctgc 4680
aggacgtgga atgcgaggag aggccccggg gaagcagctc caactgaggg tgattaaaat 4740
ctgaagcaaa gaggccaaag attggaaacc ccccacccc acctctttcc agaactgctt 4800
gaagagaact ggttggagtt atggaaaaga tgccctgtgc caggacagca gttcattgtt 4860
actgtaaccg attgtattat tttgttaaat atttctataa atatttaaga gatgtacaca 4920
tgtgtaatat aggaaggaag gatgtaaagt ggtatgatct ggggcttctc cactcctgcc 4980
ccagagtgtg gaggccacag tggggcctct ccgtatttgt gcattgggct ccgtgccaca 5040
accaagette attagtetta aattteagea tatgttgetg etgettaaat attgtataat 5100
ttacttgtat aattctatgc aaatattgct tatgtaatag gattattttg taaaggtttc 5160
tgtttaaaat attttaaatt tgcatatcac aaccctgtgg tagtatgaaa tgttactgtt 5220
aactttcaaa cacgctatgc gtgataattt ttttgtttaa tgagcagata tgaagaaagc 5280
                                                                  5288
ccggaatt
```

```
<210> 19
<211> 1447
<212> PRT
<213> Artificial Sequence
<220>
<223> Primer
<400> 19
Met Ala Ser Ala Gly Asn Ala Ala Glu Pro Gln Asp Arg Gly Gly
                                    10
Gly Ser Gly Cys Ile Gly Ala Pro Gly Arg Pro Ala Gly Gly Arg
                                25
Arg Arg Arg Thr Gly Gly Leu Arg Arg Ala Ala Pro Asp Arg Asp
                            40
        35
Tyr Leu His Arg Pro Ser Tyr Cys Asp Ala Ala Phe Ala Leu Glu Gln
                        55
Ile Ser Lys Gly Lys Ala Thr Gly Arg Lys Ala Pro Leu Trp Leu Arg
                                        75
                    70
Ala Lys Phe Gln Arg Leu Leu Phe Lys Leu Gly Cys Tyr Ile Gln Lys
                                    90
                85
Asn Cys Gly Lys Phe Leu Val Val Gly Leu Leu Ile Phe Gly Ala Phe
                                105
                                                    110
            100
Ala Val Gly Leu Lys Ala Ala Asn Leu Glu Thr Asn Val Glu Glu Leu
                            120
```

Trp Val Glu Val Gly Gly Arg Val Ser Arg Glu Leu Asn Tyr Thr Arg Gln Lys Ile Gly Glu Glu Ala Met Phe Asn Pro Gln Leu Met Ile Gln Thr Pro Lys Glu Glu Gly Ala Asn Val Leu Thr Thr Glu Ala Leu Leu Gln His Leu Asp Ser Ala Leu Gln Ala Ser Arg Val His Val Tyr Met Tyr Asn Arg Gln Trp Lys Leu Glu His Leu Cys Tyr Lys Ser Gly Glu Leu Ile Thr Glu Thr Gly Tyr Met Asp Gln Ile Ile Glu Tyr Leu Tyr Pro Cys Leu Ile Ile Thr Pro Leu Asp Cys Phe Trp Glu Gly Ala Lys Leu Gln Ser Gly Thr Ala Tyr Leu Leu Gly Lys Pro Pro Leu Arg Trp Thr Asn Phe Asp Pro Leu Glu Phe Leu Glu Glu Leu Lys Lys Ile Asn Tyr Gln Val Asp Ser Trp Glu Glu Met Leu Asn Lys Ala Glu Val Gly His Gly Tyr Met Asp Arg Pro Cys Leu Asn Pro Ala Asp Pro Asp Cys Pro Ala Thr Ala Pro Asn Lys Asn Ser Thr Lys Pro Leu Asp Met Ala Leu Val Leu Asn Gly Gly Cys His Gly Leu Ser Arg Lys Tyr Met His Trp Gln Glu Glu Leu Ile Val Gly Gly Thr Val Lys Asn Ser Thr Gly Lys Leu Val Ser Ala His Ala Leu Gln Thr Met Phe Gln Leu Met Thr Pro Lys Gln Met Tyr Glu His Phe Lys Gly Tyr Glu Tyr Val Ser His Ile Asn Trp Asn Glu Asp Lys Ala Ala Ala Ile Leu Glu Ala Trp Gln Arg Thr Tyr Val Glu Val Val His Gln Ser Val Ala Gln Asn Ser Thr Gln Lys Val Leu Ser Phe Thr Thr Thr Thr Leu Asp Asp Ile Leu Lys Ser Phe Ser Asp Val Ser Val Ile Arg Val Ala Ser Gly Tyr Leu Leu Met Leu Ala Tyr Ala Cys Leu Thr Met Leu Arg Trp Asp Cys Ser Lys Ser Gln Gly Ala Val Gly Leu Ala Gly Val Leu Leu Val Ala Leu Ser Val Ala Ala Gly Leu Gly Leu Cys Ser Leu Ile Gly Ile Ser Phe Asn Ala Ala Thr Thr Gln Val Leu Pro Phe Leu Ala Leu Gly Val Gly Val Asp Asp Val Phe Leu Leu Ala His Ala Phe Ser Glu Thr Gly Gln Asn Lys Arg Ile Pro Phe Glu Asp Arg Thr Gly Glu Cys Leu Lys Arg Thr Gly Ala Ser Val Ala Leu Thr Ser Ile Ser Asn Val Thr Ala Phe Phe Met Ala Ala Leu Ile Pro Ile Pro Ala Leu Arg Ala Phe Ser Leu Gln Ala Ala Val Val Val Phe Asn Phe Ala Met Val Leu Leu Ile Phe

Pro Ala Ile Leu Ser Met Asp Leu Tyr Arg Arg Glu Asp Arg Arg Leu Asp Ile Phe Cys Cys Phe Thr Ser Pro Cys Val Ser Arg Val Ile Gln Val Glu Pro Gln Ala Tyr Thr Asp Thr His Asp Asn Thr Arg Tyr Ser Pro Pro Pro Tyr Ser Ser His Ser Phe Ala His Glu Thr Gln Ile Thr Met Gln Ser Thr Val Gln Leu Arg Thr Glu Tyr Asp Pro His Thr His Val Tyr Tyr Thr Thr Ala Glu Pro Arg Ser Glu Ile Ser Val Gln Pro Val Thr Val Thr Gln Asp Thr Leu Ser Cys Gln Ser Pro Glu Ser Thr Ser Ser Thr Arg Asp Leu Leu Ser Gln Phe Ser Asp Ser Ser Leu His Cys Leu Glu Pro Pro Cys Thr Lys Trp Thr Leu Ser Ser Phe Ala Glu Lys His Tyr Ala Pro Phe Leu Leu Lys Pro Lys Ala Lys Val Val Val Ile Phe Leu Phe Leu Gly Leu Leu Gly Val Ser Leu Tyr Gly Thr Thr Arg Val Arg Asp Gly Leu Asp Leu Thr Asp Ile Val Pro Arg Glu Thr Arg Glu Tyr Asp Phe Ile Ala Ala Gln Phe Lys Tyr Phe Ser Phe Tyr Asn Met Tyr Ile Val Thr Gln Lys Ala Asp Tyr Pro Asn Ile Gln His Leu Leu Tyr Asp Leu His Arg Ser Phe Ser Asn Val Lys Tyr Val Met Leu Glu Glu Asn Lys Gln Leu Pro Lys Met Trp Leu His Tyr Phe Arg Asp Trp Leu Gln Gly Leu Gln Asp Ala Phe Asp Ser Asp Trp Glu Thr Gly Lys Ile Met Pro Asn Asn Tyr Lys Asn Gly Ser Asp Asp Gly Val Leu Ala Tyr Lys Leu Leu Val Gln Thr Gly Ser Arg Asp Lys Pro Ile Asp Ile Ser Gln Leu Thr Lys Gln Arg Leu Val Asp Ala Asp Gly Ile Ile Asn Pro Ser Ala Phe Tyr Ile Tyr Leu Thr Ala Trp Val Ser Asn Asp Pro Val Ala Tyr Ala Ala Ser Gln Ala Asn Ile Arg Pro His Arg Pro Glu Trp Val His Asp Lys Ala Asp Tyr Met Pro Glu Thr Arg Leu Arg Ile Pro Ala Ala Glu Pro Ile Glu Tyr Ala Gln Phe Pro Phe Tyr Leu Asn Gly Leu Arg Asp Thr Ser Asp Phe Val Glu Ala Ile Glu Lys Val Arg Thr Ile Cys Ser Asn Tyr Thr Ser Leu Gly Leu Ser Ser Tyr Pro Asn Gly Tyr Pro Phe Leu Phe Trp Glu Gln Tyr Ile Gly Leu Arg His Trp Leu Leu Phe Ile Ser Val Val Leu Ala Cys Thr Phe Leu Val Cys Ala Val Phe Leu Leu Asn Pro Trp Thr Ala Gly Ile Ile

Val Met Val Leu Ala Leu Met Thr Val Glu Leu Phe Gly Met Met Gly Leu Ile Gly Ile Lys Leu Ser Ala Val Pro Val Val Ile Leu Ile Ala Ser Val Gly Ile Gly Val Glu Phe Thr Val His Val Ala Leu Ala Phe Leu Thr Ala Ile Gly Asp Lys Asn Arg Arg Ala Val Leu Ala Leu Glu His Met Phe Ala Pro Val Leu Asp Gly Ala Val Ser Thr Leu Leu Gly Val Leu Met Leu Ala Gly Ser Glu Phe Asp Phe Ile Val Arg Tyr Phe Phe Ala Val Leu Ala Ile Leu Thr Ile Leu Gly Val Leu Asn Gly Leu Val Leu Leu Pro Val Leu Leu Ser Phe Phe Gly Pro Tyr Pro Glu Val Ser Pro Ala Asn Gly Leu Asn Arg Leu Pro Thr Pro Ser Pro Glu Pro Pro Pro Ser Val Val Arg Phe Ala Met Pro Pro Gly His Thr His Ser Gly Ser Asp Ser Ser Asp Ser Glu Tyr Ser Ser Gln Thr Thr Val Ser Gly Leu Ser Glu Glu Leu Arg His Tyr Glu Ala Gln Gln Gly Ala Gly Gly Pro Ala His Gln Val Ile Val Glu Ala Thr Glu Asn Pro Val Phe Ala His Ser Thr Val Val His Pro Glu Ser Arg His His Pro Pro Ser Asn Pro Arg Gln Gln Pro His Leu Asp Ser Gly Ser Leu Pro Pro Gly Arg Gln Gly Gln Pro Arg Arg Asp Pro Pro Arg Glu Gly Leu Trp Pro Pro Leu Tyr Arg Pro Arg Arg Asp Ala Phe Glu Ile Ser Thr Glu Gly His Ser Gly Pro Ser Asn Arg Ala Arg Trp Gly Pro Arg Gly Ala Arg Ser His Asn Pro Arg Asn Pro Ala Ser Thr Ala Met Gly Ser Ser Val Pro Gly Tyr Cys Gln Pro Ile Thr Thr Val Thr Ala Ser Ala Ser Val Thr Val Ala Val His Pro Pro Pro Val Pro Gly Pro Gly Arg Asn Pro Arg Gly Gly Leu Cys Pro Gly Tyr Pro Glu Thr Asp His Gly Leu Phe Glu Asp Pro His Val Pro Phe His Val Arg Cys Glu Arg Arg Asp Ser Lys Val Glu Val Ile Glu Leu Gln Asp Val Glu Cys Glu Glu Arg Pro Arg Gly Ser Ser Ser Asn

```
<210> 20
<211> 11
<212> DNA
<213> Artificial Sequence
<220>
<223> Nucleic acid primer
```

<400> 20 atatccagca c	11
<210> 21 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 21 ctgagcagat ttcccaggtc	20
<210> 22 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 22 cctcagacag acctttcctc	20
<210> 23 <211> 24 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 23 gagtttgcag tgatgttgct attc	24
<210> 24 <211> 19 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 24 accgccttac ctgctgctc	19
<210> 25 <211> 26 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 25 tgcactaatt ttcttattac agtgag	26
<210> 26	

<211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 26 taaggcacac tactggggtg	20
<210> 27 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 27 gaacacccca gtagtgtgcc	20
<210> 28 <211> 26 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 28 tgagtcctag agaagtcaca gacatc	26
<210> 29 <211> 21 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 29 ggctcttttc atggtctcgt c	21
<210> 30 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 30 tgttttgctc tccacccttc	20
<210> 31 <211> 23 <212> DNA <213> Artificial Sequence	

<220> <223> Nucleic acid primer	
<400> 31 gcactggatt ttaacaaggc atg	23
<210> 32 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 32 agggcataga ttgtcctcgg	20
<210> 33 <211> 21 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 33 tgggaatact gatgatgtgc c	21
<210> 34 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 34 cataaccage gagtetgeae	20
<210> 35 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 35 catttgggca tttcgcattc	20
<210> 36 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 36	

accaaaccaa actccagccc	20
<210> 37 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 37 tgcccccatt gttctgcttg	20
<210> 38 <211> 21 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 38 ggacagcaga taaatggctc c	21
<210> 39 <211> 23 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 39 gcatctcgca tgtctaatgc cac	23
<210> 40 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 40 aagctgtgat gtccccaaag	20
<210> 41 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 41 gaccatgtcc agtgcagctc	20
<210> 42 <211> 20	

<212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 42 cgttcaggat caccacagcc	20
<210> 43 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 43 agtcctctga ttgggcggag	20
<210> 44 <211> 22 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 44 ccattctgca cccaatcaaa ag	22
<210> 45 <211> 22 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 45 aaaatggcag aatgaaagca cc	22
<210> 46 <211> 22 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 46 ctgatgaact ccaaaggttc tg	22
<210> 47 <211> 20 <212> DNA <213> Artificial Sequence	
<220>	

<223> Nucleic acid primer	
<400> 47 ggaagagtca gtggtgctcc	20
<210> 48 <211> 19 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 48 cgccaaagac cgaaaggac	19
<210> 49 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 49 agggtccttc tggctgcgag	20
<210> 50 <211> 19 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 50 gctgtcaagc agcctccac	19
<210> 51 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 51 gctctcaagg cagaagtgtg	20
<210> 52 <211> 21 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 52 ggaaggcacc tctgtaagtt c	21

<210> 53 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 53 gctcctaacc tgtgcccttc	20
<210> 54 <211> 22 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 54 gaatttgact tccacaaagc cc	22
<210> 55 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 55 cgcccactga ccactgtgtg	20
<210> 56 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 56 gagccagagg aaatgggttg	20
<210> 57 <211> 21 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 57 agcatttacc aggtgaagtc c	21
<210> 58 <211> 18 <212> DNA <213> Artificial Sequence	

<220> <223> Nucleic acid primer	
<400> 58 ttgcacacgc ctgcttac	18
<210> 59 <211> 18 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 59 tgttcccgtt tcctcttg	18
<210> 60 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 60 gcacaggaaa cacagcattc	20
<210> 61 <211> 22 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 61 gcaggtaaat ggacaagaac ac	22
<210> 62 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 62 actaccacgg tgggaagacc	20
<210> 63 <211> 20 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 63	

cccttctaac ccaccctcac	20
<210> 64 <211> 18 <212> DNA <213> Artificial Sequence	
<220> <223> Nucleic acid primer	
<400> 64 gacacatcag ccttgctc	18